CLAIMS

1. A method for controlling image formation using an image forming apparatus provided with a photoconductor for carrying an electrostatic latent image and an image density sensor, which has a light emitting unit and a light receiving unit, for detecting the image density of a toner pattern image obtained by developing the electrostatic latent image, comprising steps of:

forming an electrostatic latent image on the photoconductor by exposing the photoconductor, which is charged with electricity, to light;

emitting light, by the light emitting unit, onto a toner pattern image obtained by developing the electrostatic latent image;

detecting the image density of the toner pattern image by the image density sensor, by detecting the quantity of light reflected at the toner pattern image by the light receiving unit;

controlling at least one of conditions for image formation, which include a charging voltage for charging the photoconductor, a light exposure of the photoconductor, a development bias voltage to be applied for developing the electrostatic latent image and the amount of toner supplied for developing the electrostatic latent image, on the basis of the detected image density; and

calibrating the image density sensor so that a detection value of image density of a toner pattern image, which is formed on the basis of the conditions for image formation controlled as above,

becomes a predetermined reference value.

2. The image formation controlling method according to Claim 1, further comprising steps of:

forming chromatic toner pattern images of subtractive three principle colors, respectively, on the basis of the conditions for image formation controlled as above; and

calibrating the image density sensor so that detection values of image density of the toner pattern images respectively become reference values.

3. The image formation controlling method according to Claim 2, wherein the detecting step includes a step of detecting the image density of a chromatic toner pattern image on the basis of the quantity of diffusely reflected light.

4. The image formation controlling method according to Claim 1, wherein the detecting step includes a step of detecting the image density of an achromatic toner pattern image on the basis of the quantity of specularly reflected light.

5. The image formation controlling method according to Claim 1, wherein the calibrating step includes a step of calibrating the image density sensor by adjusting the quantity of light emitted from the light emitting unit, which is provided at the image density

sensor, for emitting light onto a toner pattern image.

6. The image formation controlling method according to Claim 1, wherein the calibrating step includes a step of calibrating the image density sensor by adjusting the optical sensitivity of the light receiving unit, which is provided at the image density sensor, for receiving light emitted onto a toner pattern image.

7. The image formation controlling method according to Claim 1, wherein the calibrating step is performed after replacement of at least one of constituent parts of the image forming apparatus including the image density sensor and the photoconductor.

8. A method for controlling image formation using an image forming apparatus provided with a photoconductor for carrying an electrostatic latent image, a transfer member for carrying a toner pattern image obtained by developing and transferring the electrostatic latent image and an image density sensor, which has a light emitting unit and a light receiving unit, for detecting the image density of the toner pattern image on the transfer member, comprising steps of:

forming an electrostatic latent image on the photoconductor by exposing the photoconductor, which is charged with electricity, to light;

emitting light, by the light emitting unit, onto a toner pattern image obtained by developing the electrostatic latent image and transferring the electrostatic latent image onto the transfer member;

detecting the image density of the toner pattern image by the image density sensor, by detecting the quantity of light reflected at the toner pattern image by the light receiving unit;

controlling at least one of conditions for image formation, which include a charging voltage for charging the photoconductor, a light exposure of the photoconductor, a development bias voltage to be applied for developing the electrostatic latent image, the amount of toner supplied for developing the electrostatic latent image and a transfer bias voltage to be applied for transferring the toner pattern image, on the basis of the detected image density; and

calibrating the image density sensor so that a detection value of image density of a toner pattern image, which is formed on the basis of the conditions for image formation controlled as above, becomes a predetermined reference value.

9. An image forming apparatus comprising:

an electrostatic latent image forming unit for forming an electrostatic latent image on a photoconductor by exposing the photoconductor, which is charged with electricity, to light;

a toner pattern image forming unit for forming a toner pattern image by developing the electrostatic latent image;

an image density sensor, which includes a light emitting unit and a light receiving unit, for emitting light onto the toner pattern image, receiving light reflected at the toner pattern image, converting a current, which arises from the received light, into a voltage and detecting the image density of the toner pattern image on the basis of an amplified value;

an image formation condition controlling unit for controlling at least one of conditions for image formation, which include a charging voltage for charging the photoconductor, a light exposure of the photoconductor, a development bias voltage to be applied for developing the electrostatic latent image and the amount of toner supplied for developing the electrostatic latent image, on the basis of the detected image density; and

an image density controlling unit for controlling the image density sensor so that a value of image density of the toner pattern image, which is formed on the basis of the conditions for image formation controlled as above, becomes a predetermined reference value,

the image density controlling unit being capable of changing an optical output of the light emitting unit.

10. An image forming apparatus comprising:

an electrostatic latent image forming unit for forming an electrostatic latent image on a photoconductor by exposing the photoconductor, which is charged with electricity, to light;

a toner pattern image forming unit for forming a toner pattern image by developing the electrostatic latent image;

an image density sensor, which includes a light emitting unit and a light receiving unit, for emitting light onto the toner pattern image, receiving light reflected at the toner pattern image, converting a current, which arises from the received light, into a voltage and detecting the image density of the toner pattern image on the basis of an amplified value;

an image formation condition controlling unit for controlling at least one of conditions for image formation, which include a charging voltage for charging the photoconductor, a light exposure of the photoconductor, a development bias voltage to be applied for developing the electrostatic latent image and the amount of toner supplied for developing the electrostatic latent image, on the basis of the detected image density; and

an image density controlling unit for controlling the image density sensor so that a value of image density of the toner pattern image, which is formed on the basis of the conditions for image formation controlled as above, becomes a predetermined reference value,

the image density controlling unit being capable of performing at least one of:

changing a resistance to be used for converting a current, which arises from light reflected at the toner pattern image and received by the light receiving unit, into a voltage; and

changing a gain to be used for amplification after converting the current into a voltage.